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Courses » Principle of Hydraulic Machines and System Design

Announcements Course Ask a Question Progress Mentor FAQ

Unit 7 - Week 5 - Pump Characteristics and System Design

Course outline

How to access the portal

Introductory Session

Week 1 - Principle of Operation of Hydraulic Machines

Week 2 - Radial and Axial Flow Pumps

Week 3 - Radial Flow Pump Operational Issues

Week 4 - Pump Design: Degrees of Reaction

Week 5 - Pump Characteristics and System Design

- Pumps operation: series and parallel, problems
- Pumps operation:

Assignment 05

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2018-09-12, 23:59 IST.

1) Friction losses in a pumping system is *1 point*

- Proportional to Q^2
- Proportional to $\frac{1}{Q}$
- Proportional to $\frac{1}{Q^2}$
- Proportional to $\frac{1}{Q^3}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
Proportional to Q^2

2) Pump efficiency increases with specific speed. This statement is *1 point*

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

3) If the speed of a centrifugal pump is doubled, its power consumption increases by _____ times. *1 point*

No, the answer is incorrect.
Score: 0

Accepted Answers:
8

4) A centrifugal pump with a variable frequency drive discharge water at the rate of 200 gallons per minute. The pump is running at 2500 rpm and it has a head of 250 feet. The operating power is 40 horsepower. If the pump speed is reduced to 2000 rpm what will be the revised flow rate and head? ***1 point***

- 120 gallons per minute, 160 feet
- 160 gallons per minute, 160 feet
- 160 gallons per minute, 120 feet
- 120 gallons per minute, 120 feet

No, the answer is incorrect.
Score: 0

Accepted Answers:
160 gallons per minute, 160 feet

5) A centrifugal pump running at 1500 rpm has an impeller of 20 inch in diameter. The operating power is 12 horsepower when delivering 260 gallons per minute at a head of 120 feet. When the impeller diameter is reduced to 10 inch what is the new discharge and power required ? ***1 point***

- 120 gallons per minute, 1.5 horsepower
- 130 gallons per minute, 1.8 horsepower
- 120 gallons per minute, 1.8 horsepower
- 130 gallons per minute, 1.5 horsepower

No, the answer is incorrect.
Score: 0

Accepted Answers:
130 gallons per minute, 1.5 horsepower

6) Which of the following statement/statements is/are correct ***1 point***

- The primary objective of series operation of pump is to get higher head.
- The primary objective of parallel operation of pump is to get higher head.
- The primary objective of parallel operation of pump is to get higher discharge.
- The primary objective of series operation of pump is to get higher discharge.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The primary objective of series operation of pump is to get higher head.
The primary objective of parallel operation of pump is to get higher discharge.

7) Which of the following pumps has the highest specific speed ? ***1 point***

- Mixed Flow
- Radial Flow
- Axial Flow

No, the answer is incorrect.
Score: 0

Accepted Answers:
Axial Flow

8) For an axial flow pump the tip diameter is 1.5 m, the hub diameter is 1.2 m. The operating speed of the pump is 1500 rpm. The absolute inlet angle is 60^0 and the blade inlet angle is 30^0. Using the mean diameter of the blade calculate the volume flow rate in m^3/sec.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 29.18,29.22

1 point

9) A centrifugal pump running at N rpm deliver Q amount of water at a head of H. The dimensionless specific speed of the pump is given by (g is the acceleration due to gravity). ***1 point***

- $\frac{NQ^2}{gH}$
- $\frac{NQ^{\frac{1}{2}}}{(gH)^{\frac{3}{4}}}$
- $\frac{NQ^{\frac{1}{2}}}{(gH)^{\frac{3}{5}}}$
- $\frac{2NQ^{\frac{1}{2}}}{(gH)^{\frac{3}{5}}}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{NQ^{\frac{1}{2}}}{(gH)^{\frac{3}{4}}}$

10) A radial flow pump is running at N rpm has an impeller diameter of D. The density of the working fluid is ρ. The pump delivers Q amount of fluid at a head of H. The flow coefficient of the pump can be expressed as (g is the acceleration due to gravity) ***1 point***

- $\frac{Q}{\rho N^3 D^5}$
- $\frac{gH}{ND^3}$
- $\frac{Q}{gN^3D^2}$
- $\frac{Q}{ND^3}$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$\frac{Q}{ND^3}$

Previous Page End